IN THE CLAIMS

1. (Currently Amended) A method of manufacturing a rigid foam comprising:

~~preparing a polymer melt;~~

incorporating nano-particles into ~~the~~ a polymer melt, said nano-particles being selected from the group consisting of nano-clays, calcium carbonate, intercalated graphites and expanded graphites;

incorporating a blowing agent into the polymer melt under a first pressure and at a first temperature;

extruding the polymer melt under a second pressure and at a second temperature, the second pressure and second temperature being sufficient to allow the polymer melt to expand and form a foam; and

cooling the foam to form a foam product having an average cell size, a cell size distribution, an average cell wall thickness, an average cell strut diameter, a cell orientation, a thermal conductivity, a foam density and a foam strength, said average cell size being greater than approximately 60 μm.

2. (Original) A method of manufacturing a rigid foam according to claim 1, wherein:

the polymer includes a major portion of at least one alkenyl aromatic polymer selected from a group consisting of alkenyl aromatic homopolymers, copolymers of alkenyl aromatic compounds and copolymerizable ethylenically unsaturated comonomers.

3. (Currently Amended) A method of manufacturing a rigid foam according to claim 2, wherein:

the polymer includes a major portion of at least one alkenyl aromatic polymer selected from ~~a~~ the group consisting of the polymerization products of styrene, α-methylstyrene, chlorostyrene, bromostyrene, ethylstyrene, vinyl benzene[[,]] and vinyl toluene; and

a minor ~~portions~~ portion of a non-alkenyl aromatic polymer.

4. (Original) A method of manufacturing a rigid foam according to claim 3, wherein:

the polymer includes at least 80 wt% polystyrene.

5. (Original) A method of manufacturing a rigid foam according to claim 2, wherein:

the blowing agent includes at least one composition selected from a group consisting of aliphatic hydrocarbons having 1-9 carbon atoms, halogenated aliphatic hydrocarbons having 1-4 carbon atoms, carbon dioxide, nitrogen, water, azodicarbonamide and p-toluenesulfonyl.

6. (Currently Amended) A method of manufacturing a rigid foam according to claim 5, wherein:

the blowing agent includes at least one composition selected from a group consisting of methane, methanol, ethane, ethanol, propane, propanol, n-butane, ~~and~~ isopentane, carbon dioxide, nitrogen, water, azodicarbonamide, p-toluenesulfonyl, HCFC-142b and HCFC-134a.

7. (Original) A method of manufacturing a rigid foam according to claim 2, further comprising:

incorporating an additive into the polymer melt before forming the foam.

8. (Original) A method of manufacturing a rigid foam according to claim 7, wherein:

the additive includes at least one composition selected from a group consisting of flame retardants, mold release agents, pigments and fillers.

9. (Currently Amended) A method of manufacturing a rigid foam according to claim 2, wherein:

the nano-particles have a minimum dimension of less than about 100 nm and said nano-clays are selected from ~~a~~ the group consisting of ~~calcium carbonate,~~ intercalated clays~~,~~ ~~intercalated graphites,~~ and exfoliated clays ~~and expanded graphites~~.

10. (Original) A method of manufacturing a rigid foam according to claim 9, wherein:

the nano-particles are incorporated into the polymer melt at a rate of between 0.01 and 10 weight percent, based on polymer weight.

11. (Original) A method of manufacturing a rigid foam according to claim 9, wherein:

the nano-particles are incorporated into the polymer melt at a rate of between 0.5 and 5 weight percent, based on polymer weight.

12. (Original) A method of manufacturing a rigid foam according to claim 11, wherein:

the nano-particles include a major portion of nano-Montmorillonite (MMT); and

the polymer includes a major portion of polystyrene (PS), polyethylene (PE) or polymethyl methacrylate (PMMA).

13. (Original) A method of manufacturing a rigid foam according to claim 10, wherein:

the nano-particles are formed by a technique selected from a group consisting of intercalation with polystyrene, in-situ polymerization of polystyrene (PS) or polymethyl methacrylate (PMMA) with a surface modified nano-Montmorillonite (MMT), and exfoliation of expandable graphite particles in a polystyrene or polymethyl methacrylate matrix.

14. (Original) A method of manufacturing a rigid foam according to claim 2, wherein:

the average cell size is less than about 500 μm;

the average cell wall thickness is less than about 10 μm;

the average strut diameter is less than about 20 μm;

the cell orientation is between about 0.5 and 2.0; and

the foam density is less than about 100 kg/m^3.

15. (Original) A method of manufacturing a rigid foam according to claim 14, wherein:

the average cell size is between about 60 and about 120 μm;

the average cell wall thickness is between about 0.2 and about 1.0 μm;

the average strut diameter is between about 4 and about 8 μm;

the cell orientation is between about 1.0 and about 1.5; and

the foam density is between about 20 and about 50 kg/m^3.

16. (Original) A method of manufacturing a rigid foam according to claim 2, further comprising:

incorporating a conventional nucleation agent into the polymer melt at a rate of less than about 2 weight percent based on polymer weight.

17. – 20. Canceled

21. (New) A method of manufacturing a rigid foam comprising:

incorporating acicular nano-particles into a polymer melt;

adding a blowing agent to said polymer melt under a first pressure and at a first temperature;

extruding said polymer melt under a second pressure and at a second temperature, said second pressure and said second temperature being sufficient to allow said polymer melt to expand and form a foam; and

cooling said foam to form a foam product.

22. (New) The method of claim 21, further comprising the step of:

incorporating a nucleating agent into said polymer melt.

23. (New) The method of claim 21, wherein said foam has a cell orientation of at least about 1.2.

24. (New) A method of manufacturing a rigid foam comprising:

incorporating nano-particles into a polymer melt;

adding a blowing agent to said polymer melt under a first pressure and at a first temperature;

extruding said polymer melt under a second pressure and at a second temperature, said second pressure and said second temperature being sufficient to allow said polymer melt to expand and form a foam; and

cooling said foam to form a foam product having an average cell size between about 60 and about 120 μm.